Candidate's Name: …….

Signature: …… Stream: ……

553/1

BIOLOGY

(Theory)

Paper 1

Oct/Nov. 2020

2 ½ HOURS

UGANDA CERTIFICATE OF EDUCATION

BIOLOGY

(THEORY)

Paper 1

TIME: 2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES:

This paper consists of sections **A, B** and **C.**

Answer **all** questions in sections **A** and **B**, plus **two** questions in section **C**.

Write the answers to section **A** in the boxes provided, answers to section **B** in the spaces provided and answers to section **C** in the answer booklets provided.

For examiners' use Only		
Section	**Marks**	**Examiner's Signature**
A:		
B: No. 31 **No.32** **No. 33**		
C: No. **No.**		
Total		

SECTION A (30 MARKS)

*Answer **all** questions in this section. Write the letter representing the most correct answer to each question in the box provided.*

1. Which of the following formulae is correct for calculating magnification of a specimen when using a hand lens?

A. Size of image x Size of the real specimen
B. Size of the image + Size of real object
C. Size of the real specimen ÷ Size of the real specimen
D. Size of the image ÷ Size of the real specimen

2. Which of the following is an example of a modified root?

A. Irish potato tuber
B. Rhizome
C. Cassava tuber
D. Corm

3. Which one of the following activities takes place during the larval stage in the lifecycle of a housefly?

A. Hibernation
B. Organ formation
C. Feeding
D. Resting

4. **Figure 1** below is a leaf type.

Which type of leaf is represented in the figure above?

A. Compound digitate
B. Compound trifoliate
C. Compound pinnate
D. Compound Bipinnate

5. A medium of low pH stops the action of

A. Pepsin
B. Lipase
C. Ptyalin
D. Maltase

6. In an experiment to find the proportion of air in soil, the following results were obtained.

Volume of soil = Wcm^3

Volume of water added to soil =300cm^3

Volume of soil + water after stirring = Zcm^3

Which one of the following expressions gives the volume of air in the soil sample?

A. Z - W cm^3

B. (W + 300) – Z cm^3

C. Z – 300 cm^3

D. Z – (W + 200) cm^3

7. A soil sample was heated strongly to red hot. Which component of soil was being investigated?

A. Humus

B. Microorganisms

C. Air

D. Water

8. ***<u>Mimosa pudica</u>*** exhibits which type of nastic response?

A. Photonasty

B. Hydronasty

C. Haptonasty

D. Thermonasty

9. Which of the following is the intermediate host for pig-tape worm?

A. Man

B. Pig

C. Cow

D. Undercooked pork

10. Which of the following is the function of choroid of the mammalian eye

A. Absorbs light and prevents total internal reflection

B. Protects the delicate inner layers of the eye

C. Transmits sensory impulses from the retina to the brain for interpretations

D. Provides nutrients and oxygen to the cornea and eye lens

11. An endosperm is formed in plants when the second male nucleus fuses with the

A. Egg nucleus

B. Antipodal nuclei

C. Embryo

D. Polar nuclei

12. When a plant cell is put in a hypotonic solution it becomes

A. Flaccid
B. Turgid
C. Crenated
D. Haemolysed

13. Secondary growth in a flowering plant is caused by;

A. Cortex cells
B. Phloem cells
C. Xylem Vessels
D. Cambium cells

14. When the tip of a maize coleoptile is covered with an aluminum foil and then illuminated on one side, it grows straight because,

A. The foil kills the hormones in the coleoptile
B. The tip does not receive the light stimulus
C. Hormones in the coleoptile move to the zone of elongation
D. The foil activates the hormones in the coleoptile

15. The following are features found in birds.

(i) Light bones
(ii) Webbed feet.
(iii) Presence of features.
(iv) Streamlined body.

Which of the features are adaptations for flight?

A. (i) and (ii)
B. (ii) and (iii)
C. (iii) and (iv)
D. (i) and (iv)

16. In estimating the population of Tilapia in a fish pond, 80 fish were captured, marked and released. After 2 days, 50 were captured and out of which 20 were marked. The population of Tilapia in the fish pond was;

A. 300
B. 400
C. 200
D. 100

17. Which one of the following is common respiration and photosynthesis?

A. Energy is released.
B. Both occur in all living cells.
C. Food oxidations is common to both.
D. Oxygen, carbondioxide and water are involved.

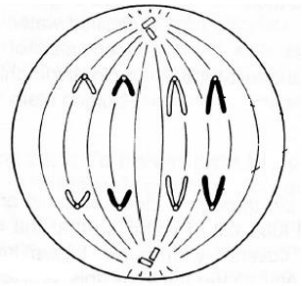
18. In mammals, the anti-diuretic hormone (ADH)

A. stimulate the reabsorption of water in the urinary tubules.
B. Inhibits the reabsorption of water in urineferous tubules.
C. inhibits the action of osmoreceptors regulate the osmotic pressure of blood.
D. Stimulates the nephron so that there is an increase in the formation of the glomerular filtrate.

19. When a white flowred plant was crossed with a red flowered plant, all the F1 Offspring had pink flowers. If a pink flowered plant was crossed with a pinked flowered plant, the offspring flowers would be expected to be

A. all pink
B. all red
C. all white
D. a mixture of red, white and pink.

20. What stage of cell division is represented in the figure 2 below?



A. Anaphase
B. Prophase
C. Metaphase
D. Telophase

21. Lactic acid is likely not to accumulate

A. When engaged in a vigorous exercise
B. After breathing in excess carbon dioxide
C. Deep sleep
D. After consuming alcohol

22. Which one of the following is an adaptation to ensure effective gaseous exchange in organisms?

A. Decreased surface area of organs involved
B. Increased thickness of gas exchange surface
C. Increased body size of organism
D. Increase in concentration gradient of gas

23. The rate of glomerular filtration is lowest in;

A. Marine vertebrates
B. Amphibians
C. Mammals
D. Fresh water animals

24. Which one of the following organisms does not use blood to carry oxygen within its body?

A. Fish
B. Bee
C. Snake
D. An earthworm

25. Natural immunity is developed by

A. Taking preventive drugs.
B. Inoculation with mild strain of pathogen.
C. Injection with antibiotics to the disease organism.
D. Casting the disease and recovering from it.

26. Which one of the following processes is not linked with transpiration?

A. Absorption of water by roots.
B. Transportation of sugars.
C. Cooling of leaves.
D. Provision of mechanical support.

27. Which one of the following is not an example of excretion?

A. A man sweating
B. A tree dropping its leaves.
C. A dog salivating
D. A goat exhaling.

28. Some of the following events occur when seeds show epigeal germination.

(i) testa slits.
(ii) hypocotyl grow fast
(iii) epicotyl grows fast
(iv) cotyledons appear above the ground
(v) cotyledons remain below the ground.

Which of the following are the events that occur?

A. (i), (ii), (iv)
B. (i), (iii), (v)
C. (iii), (iv), (v)
D. (i), (ii), (iii)

29. In man the oestrus cycle is also known as

A. heat period
B. gestation period
C. Menstrual cycle
D. lactation cycle.

30. Which one of the following pairs of bones form a ball and socket joint?

A. Humerus and Ulna
B. Femur and pelvis
C. Humerus and radius
D. Femur and tibia

SECTION B (40 MARKS)

*Answer **all** questions in this section. Answers **must** be written in the spaces provided.*

31. The table below shows different concentrations of substances in blood plasma in a part labelled **A**, in glomerular filtrate in a part labelled **B** and in urine in a part labelled **C**. Study it carefully and answer the questions that follow.

Components of Blood	***% in plasma in A***	***% in Glomerular filtrate in B***	***% in urine in C***
Proteins	7.0	0	0
Glucose	0.2	0.02	0.05
Urea	0.03	0.03	2.0
Sodium ions	0.32	0.32	0.35
Chloride ions	0.37	0.37	0.60
Water	92	98	96

(a) Identify the parts labelled ***A, B*** and ***C*** where the fluids in the table above are found.

(03 marks)

A…….

B…….....

C…….

(b) ***(i).*** Which component of urine shows the greatest percentage increase in concentration compared to the glomerular filtrate in B? ***(01 mark)***

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(ii). Fully explain why the component you have named in ***b (i)*** above has the greatest increase in concentration in Urine. ***(04 marks)***

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(c) Suggest with a reason the health condition of the person from whom the results in the tables above were obtained?

Health condition ***(01 mark)***

……

Reason ***(01 mark)***

……

(d) With a reason, state the effect of the following conditions on the amount of water excreted by the kidney.

(i) Eating salty food ***(02 marks)***

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(ii) A long loop of Henle ***(02 marks)***

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(iii) A reduction in blood pressure in the renal artery ***(02 marks)***

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(e) How is the nephron adapted to perform its functions? ***(04 marks)***

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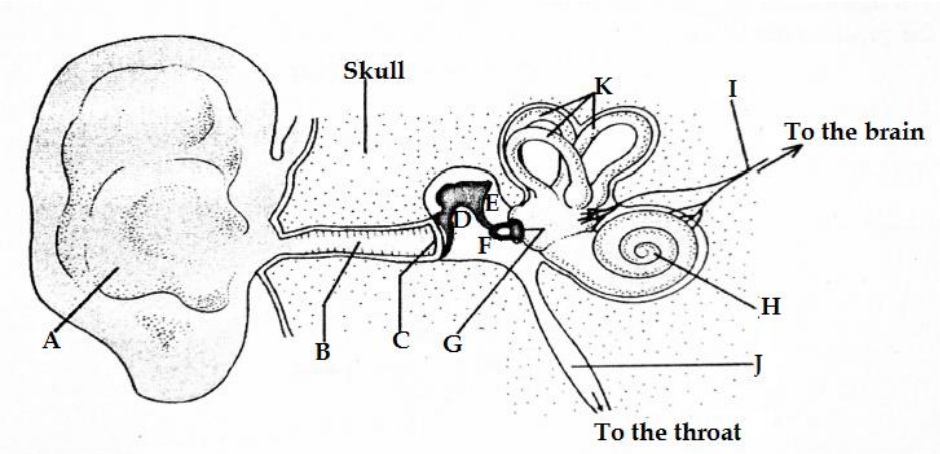
32. The figure below shows the section through the human ear. Study it carefully and answer the questions that follow.



(a) (i) Name the parts labelled ***(02 marks)***

A ……

B ……

C ……

G ……

(ii) State the general name for structures D, E and F ***(01 mark)***

……

(iii). State the function of the following structures: ***(02 marks)***

J

……

K

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(b) Describe how the structures labelled A to I are involved in the hearing process. ***(05 marks)***

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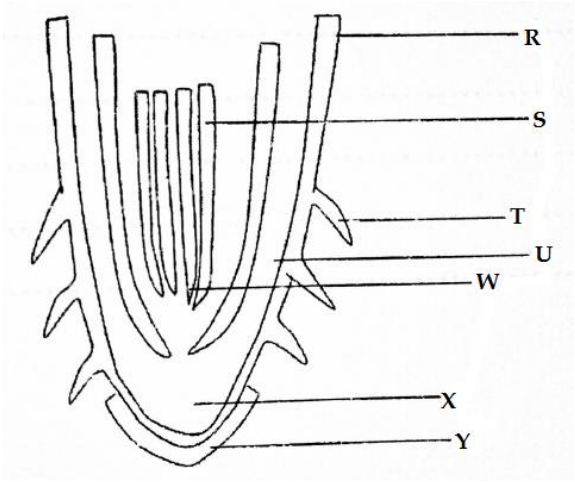
33. The figure below shows a longitudinal section through part of a plant showing its internal structures. Study it carefully and answer the questions that follow.



(a) (i) Name the parts labelled R - X ***(03 marks)***

R …….……. U ……..
S …….……. W……
T …….……. X …….

(ii) With a reason, name the part from which the figure was obtained.

Part ***(01 mark)***

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Reason ***(01 mark)***

……

(b) State the functions of parts labelled S, T and W ***(03 marks)***

S

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T

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W

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(c) How is part T adapted to perform its function? ***(03 marks)***

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SECTION C (30 MARKS)

*Answer any **two** questions from this section. Additional questions answered will **not** be **marked**. Answers to these questions must be written in the answer booklets provided.*

34. (a) With examples in each case, distinguish between;

(i) Open Blood circulation and closed blood circulation. ***(03 marks)***

(ii) Single Blood circulation and Double blood circulation. ***(03 marks)***

(b). Describe the function of blood as a transport medium in man. ***(09 marks)***

35. (a) State four differences between internal fertilization and External fertilization. ***(04 marks)***

(b). Giving examples in each case, Describe the different forms of asexual reproduction. ***(11 marks)***

36. (a)Distinguish between;

(i) Mutualism and Commensalism ***(02 marks)***

(ii). Predation and Parasitism ***(02 marks)***

(b).With examples in each case, Describe how parasites are adapted to their mode of life. ***(11 marks)***

37. (a) What is Photosynthesis? ***(02 marks)***

(b) State the two raw material, two condition and two products of photosynthesis. ***(03 marks)***

(c) Describe an experiment to show that oxygen is given off as a bi product during photosynthesis. ***(10 marks)***

END

"You will experience a painful sharpening from time to time, but this is required if you are to become a better pencil".